

## First records of *Nola harouni* from Europe and comments on the taxonomic status of *N. centonalis holsatica* (Nolidae)

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**Summary.** The nolid moth *Nola harouni* (Wiltshire, 1951) is recorded from Europe for the first time. Differential characters separating *harouni* from related species are given along with data on bionomics and distribution. A taxon referred to the species-group name *holsatica* Sauber, 1916 is considered to be a subspecies of *N. aerugula* (Hübner, 1793) (stat. rev.). It occurs along the North Sea coasts of Denmark, Holland and Germany.

**Zusammenfassung.** *Nola harouni* (Wiltshire, 1951) wird erstmalig aus Europa nachgewiesen. Differentialmerkmale zur Unterscheidung von verwandten Arten werden beschrieben, zusammen mit Daten zur Bionomie und Verbreitung. Das Artengruppen-Taxon *holsatica* Sauber, 1916 wird als Unterart von *N. aerugula* (Hübner, 1793) aufgefaßt (stat. rev.). Seine Verbreitung ist auf die Nordseeküsten von Dänemark, Deutschland und den Niederlanden beschränkt.

**Résumé.** Le nolide *Nola harouni* (Wiltshire, 1951) est mentionné d'Europe pour la première fois. De bons caractères diagnostiques séparant *N. harouni* des espèces voisines sont fournis avec des données sur la bionomie et la distribution. Le taxon référé au nom du groupe-espèce *holsatica* Sauber, 1916 est considéré comme étant une sous-espèce de *N. aerugula* (Hübner, 1793) (stat. rev.). Sa distribution se situe le long des côtes de la Mer du Nord au Danemark, aux Pays-Bas et en Allemagne.

**Key words:** Noctuoidea, *Nola*, distribution, taxonomy, Europe.

The small moths of the family Nolidae belonging to the Noctuoidea have rather uncertain taxonomic rank and position within the superfamily: at different times and by different authors they were considered as a subfamily of the Arctiidae or Noctuidae. Recently, they have been regarded as a distinct family (Nowacki & Fibiger, 1996), though a final placement of the group cannot be unambiguously found as yet. No modern revision of the Nolidae has been published, but de Freina & Witt (1987) gave a review of the European species.

In October 1972, one of the authors (MF) collected in the centre of Rhodes township with a 125 W mercury vapour lamp a rather worn specimen thought to be *N. squalida* Staudinger, 1871. Later on, in 1993, in a huge Lepidoptera collection (mainly Palaearctic Rhopalocera) donated to the Zoological Museum of Copenhagen University by the late Georg Christensen, the second author (OK) found four additional specimens from southern Greece identical to the specimen from Rhodes, of a species not covered by de Freina & Witt (1987). An examination of the genitalia proved that these specimens were not conspecific with *N. squalida*. Subsequently an additional specimen from southern Turkey turned up in the collection of MF. A further specimen from Sámos was found in the collection of Poul Svendsen, and during a collecting trip to Crete in late April 1995 three additional specimens were recognised by E. Å. Selling and MF (see below under *Material examined*). Drawings of wings and genitalia were sent to Martin Honey of The Natural History Museum in London, who quickly replied that the species in question is *N. harouni* (Wiltshire, 1951), a species described from southern Iraq but so far not recorded from Europe.

The comparative material used for the purposes of this article is deposited in the following collections: Nationaal Natuurhistorisch Museum, Leiden, The Netherlands (NNML); The Natural History Museum, London, U. K. (BMNH); Zoologisches Museum, Humboldt-Universität, Berlin, Germany (ZMHB); Zoologisk Museum, Københavns Universitet, Denmark (ZMUC), and in the private collections of Michael Fibiger (MF), E. Åge Selling (EÅS) and Poul Svendsen (PS).

### *Nola harouni* (Wiltshire, 1951)

*Celama harouni* Wiltshire, 1951. — *J. Bombay nat. Hist. Soc.* 49: 654. Type locality: Southern Iraq, Basra. Type in Wiltshire collection, now in BMNH.

**Material examined.** ♂, Greece, Rhodes, 15.X.1972 (M. Fibiger; MF); 3 ♂, ♀, Greece, Lakonía, 5 km S Monemvasía, 18.X.-17.XI.1983, 15.IX.1984 (G. Christensen; ZMUC); ♂, Turkey, Gaziantep, 16 km NE Kadirli, 700 m, 10.VII.1987 (M. Fibiger; MF); ♂, Greece, Sámos, 5-8.VIII.1990 (P. Svendsen; PS); 2 ♂, ♀, Greece, Crete, Agia Pelagia (Ayía Pelayía), 21.-25.IV.1995 (E. Å. Selling & M. Fibiger; MF, EÅS).



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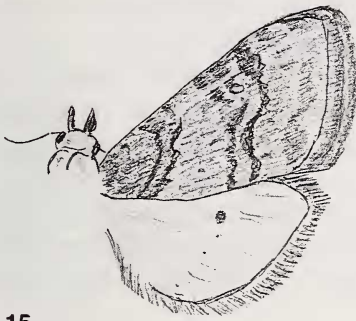
Figs. 1-14. Adults of *Nola* species: 1-2 — *N. harouni* (1 — ♂, Greece, Crete, Agia Pelagia, 22.IV.1995, M. Fibiger; MF, 2 — ♂, Greece, Lakonia, 5 km S. Monemvasia, 17.XI.1983, G. Christensen; ZMUC); 3-7 — *N. aerugula aerugula* (3 — ♂, Germany, Klotzsche, Dresden, 6.VII.1915, E.Möbius, MF, 4 — ♂, Greece, Serra, Strymon delta, 16.VIII.1985, M.Fibiger; MF, 5 — ♂, Dania, B. Snogebæk, 10.VII.1937, W. v. Deurs; ZMUC, 6 — ♀, Latvia, Wolmar, [no date], ZMUC, 7 — ♂, Dania, B. Snogebæk, 12.VII.1935, N. L. Wolff; ZMUC); 8-11 — *N. aerugula holsatica* (8 — ♂, Dania, WJ, Fanø, 14.VII.1947, N. L. Wolff; ZMUC, 9 — ♂, Dania, WJ, Fanø, 27.VII.1924, N. L. Wolff; ZMUC, 10 — ♂, Dania, SJ, Rømø, 18.VII.1976, M. Fibiger; MF, 11 — ♂, Nederland, Meerssen, 1.VII.1934, NNML). 12-14 — *N. squalida* (12 — ♂, [Spain], Malaga, 'Orign.', Staudinger; ZMHB, 13 — ♀, Italy, Puglia, Zaponet, 13.X.1982, E. v. Mentzer; MF, 14 — ♂, Spain, Malaga, Orilla de Rio Verde, 7.IV.1980, E. Traugott-Olsen; ZMUC).

**External characters.** Wingspan 14–15.5 mm, same as in closely related *N. aerugula* (Hübner, 1793) in Europe and slightly larger than very similar *N. squalida*. The ♂-antennae of all three species ciliate. Forewing ground colour brownish, in worn specimens pale brownish-yellowish, a colour rarely seen in *N. squalida*, and only seen in some forms of *N. aerugula*, but not in *N. aerugula holsatica* (Sauber, 1916). The two prominent postmedian cross-lines and the almost straight antemedian crossline of *N. harouni* separate it from the other two species. The forewing of *N. harouni* has two distinct fringelines (figs. 1, 2, 15), those of *N. aerugula* also form two lines (figs. 3–11, 16–19), but they are not so well distinguished. Those of *N. squalida* are monochromatic (figs.

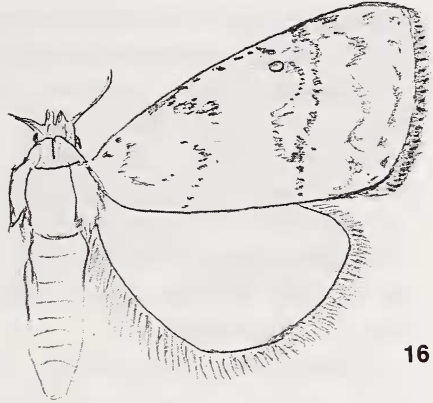
12–14). The fringes of the hindwing are darkest in *harouni*, darker than the wing ground-colour.

**Male genitalia.** Valvae bilobate, in *N. harouni* the lower lobe is the narrowest and carries a long, pointed, subbasally placed clasper (figs. 20–22). This clasper is of the same size as in *N. aerugula* (figs. 23–25) and slightly larger than in *N. squalida* (fig. 26). In *N. squalida* the upper lobe is broader as compared with those of the two other species. The size of the lobes is a little tricky to estimate, because in conventionally mounted preparations this difference is not observable: the four valval lobi *in situ* are positioned close to each other, and it is often necessary to split (tear) valvae apart. This position is shown on figs. 20–26, but was not in the slides illustrated by Diakonoff (*in* Lempke, 1938), and also shown by Forster & Wohlfahrt (1960) and de Freina & Witt (1987). From these illustrations it appears that differences between *N. aerugula* and *N. holsatica* might be found in the width of the upper valval lobi. Moreover, the claspers on the lower lobi look very small, which is incorrect. The saccus of *N. harouni* (fig. 27) is more pointed than in *N. aerugula* (figs. 28, 29). That of *N. squalida* (fig. 30) is even more pointed, triangular and narrower. The latter species bears a large, club-like, pubescent clavus. The cornutus in the aedeagus of *N. harouni* (figs. 31, 32) is thick with a broad base; in *N. aerugula* the cornutus is a plate with a small pointed protuberance from the middle (figs. 33–35); in *N. squalida* (fig. 36) it is round, without a pointed fold.

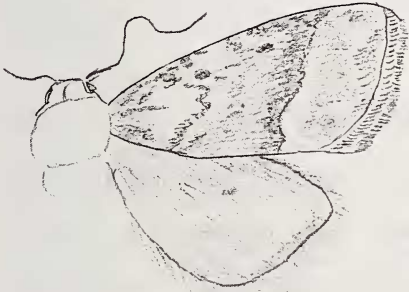
**Female genitalia.** In *N. harouni* (fig. 37) and *N. squalida* (fig. 39) differ from those of *N. aerugula* and *N. holsatica* (fig. 38) (which are identical) in having a single, quadrangular sclerotisation in anterior part of ductus bursae, and a shorter, globular corpus bursae; those of *N. aerugula* have two plates, one anterior and one posterior. The two signa in the corpus bursae differ in their texture and shape, the appearance of the latter being obviously dependent on the mounting of the preparation. Those of *N. aerugula* are small and rounded, of *N. harouni* larger, one elliptic and one subtriangular in side view. Diakonoff (*in* Lempke, 1938) figured *N. aerugula* and *N. holsatica* with only one signum in ductus bursae, and this misleading figure was



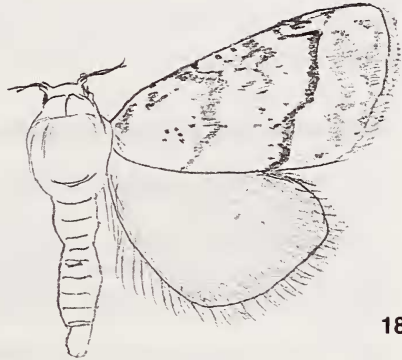
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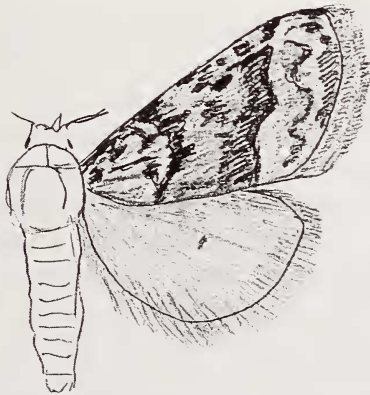
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Figs. 15-19. Right wings of *Nola* species: 15 — *N. harouni* ♂, same as fig. 1, 16-17 — *N. aerugula aerugula* (16 — ♂, same as fig. 3, 17 — ♂, same as fig. 4), 18-19 — *N. aerugula holsatica* (18 — ♂, Dania, SJ, Rømø, 18.VII.1976, 19 — ♂, same as fig. 10).

reproduced by Forster & Wohlfahrt (1960) and de Freina & Witt (1987). In *N. squalida* the corpus bursae is without signa.

**Bionomics.** The larva was illustrated in Wiltshire (1962). It feeds on various Mimosaceae and Fabaceae shrubs or herbs (Wiltshire, 1990). The habitat is bushy, dry subtropical areas, also in oases of the Middle East. The moth is attracted to light, both to 125 watt mercury vapour lamps and 8 watt superactinic ultraviolet tubes. The few collecting data available indicate that the species has at least three broods: April–May, July and October–November.

**Distribution.** Subtropical: Mediterranean Asiatic. Wiltshire (1957) calls it: Anatolian-Iranian, Pan-Eremic. It is recorded in Greece, Turkey (first records from these countries), Cyprus, Jordan, Iraq, Iran, Dhofar, Bahrain and Saudi Arabia (Wiltshire, 1980; M. Honey, pers. comm.).

***Nola aerugula holsatica* Sauber, 1916, stat. rev.**

*Phalaena Bombyx aerugula* Hübner, 1793. — Samml. auserl. Vögel Schmett. 11, pl. 61.

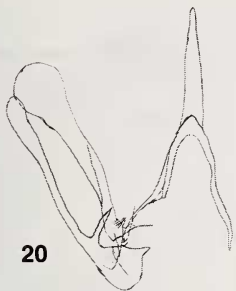
*Pyralis centonalis* Hübner, 1796. — Sammlg. europ. Schmett. 6, pl. 3, fig. 15.  
*Nola centonalis* var. *holsatica* Sauber, 1916. — *Int.ent.Z.* 10: 97.

*Nola centonalis* Hbn. subsp. *contrarialis* Heydemann, 1934. — *Int.ent.Z.* 27: 420.

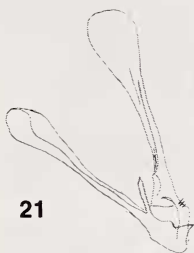
For further synonyms see Poole (1989).

During our study of *Nola* genitalia it was natural also to inquire into the taxon *holsatica*. It was pointed out by Karsholt & Nielsen (1976: 80, 87) that *holsatica* is probably only a subspecies of *N. aerugula*. This opinion has not been followed by such subsequent authors as de Freina & Witt (1987) and Fibiger & Hacker (1990), who still treated *N. holsatica* as a separate species.

*N. aerugula* is a variable species with a wide distribution in temperate and subtropical areas throughout the Palaearctic region. Specimens from populations along the North Sea coasts of Denmark, Germany and Holland are on average slightly smaller and have just a little more pointed forewings with more pronounced markings. Specimens of this type from Holland up to Hamburg in the north have a marked central shadow line on the hindwings. These were described as a local form *holsatica* by Sauber (1916). Specimens from Jutland and southwards to



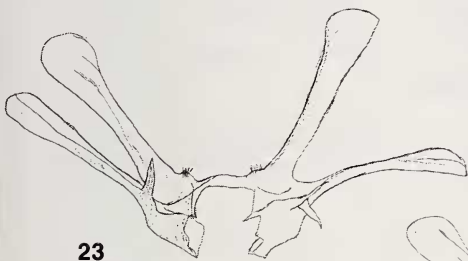
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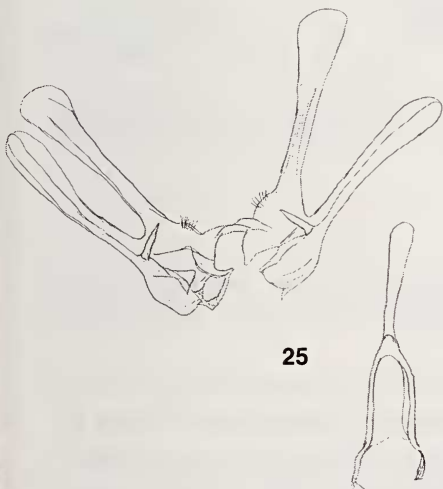
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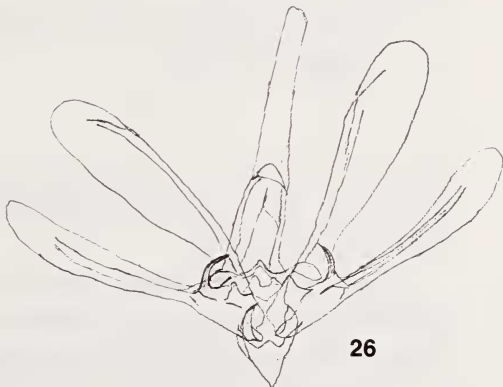
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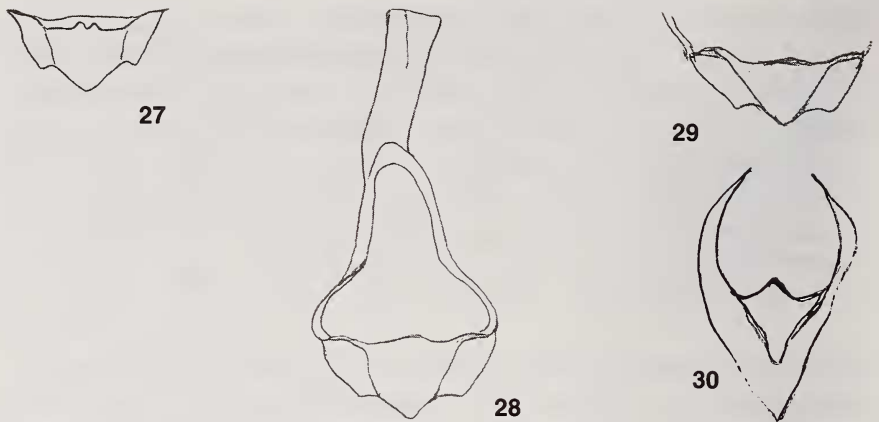
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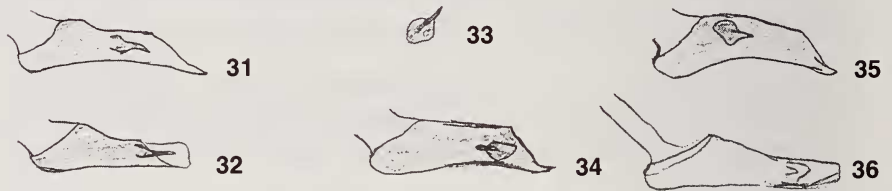
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Figs. 20-26. Male genitalia (valvae and uncus) of *Nola* species: 20-22 — *N. harouni* (MF 2162, 2164, 2165), 23-24 — *N. aerugula aerugula* (MF 2177, 2178), 25 — *N. aerugula holsatica* (MF 2180), 26 — *N. squalida* (MF 2493).





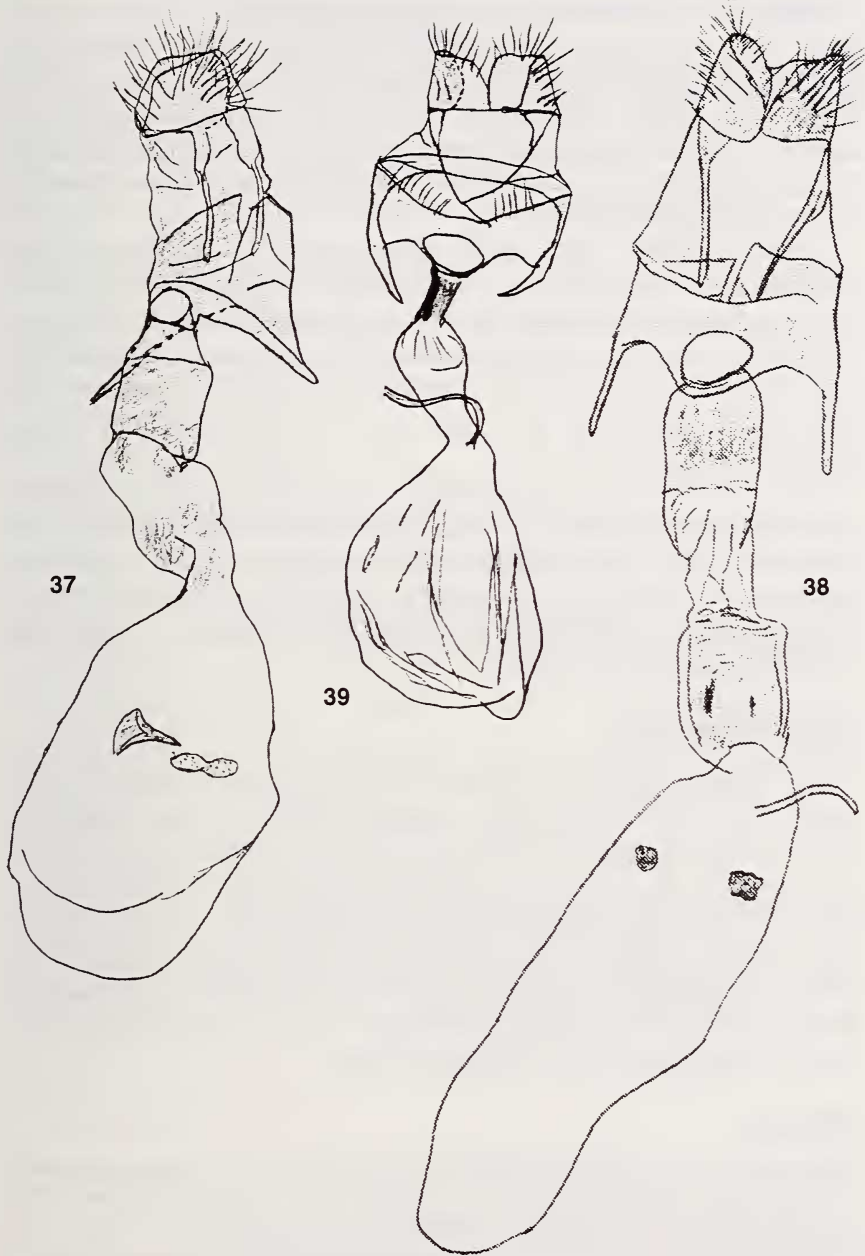
Figs. 27–30. Saccus of *Nola* species: 27 — *N. harouni* (MF 2162), 28 — *N. aerugula aerugula* (with tegumen and uncus) (MF 2178), 29 — *N. aerugula holsatica* (MF 2180), 30 — *N. squalida* (MF 2493).



Figs. 31–36. Aedeagus of *Nola* species: 31–32 — *N. harouni* (MF 2162, 2165), 33–34 — *N. aerugula aerugula* (MF 2177, 2178), 35 — *N. aerugula holsatica* (MF 2180), 36 — *N. squalida* (MF 2493).

Hamburg do not or only rarely have a marked shadow on the hindwing, and this form was described as subspecies *contrarialis* (Heydemann, 1934).

Lempke (1938) treated the form with marked shadow on the hindwing (*holsatica*) as a separate species, whereas de Freina & Witt (1987) considered *contrarialis* as a synonym of *centonalis* (= *aerugula*). Hoffmeyer (1960: 169) wrote that Sauber's type series included both specimens with and without marked shadows on the hindwing, and he considered the two forms as belonging to the same taxon, *N. holsatica*. A formal synonymisation of *contrarialis* with *aerugula* was published by Poole (1989: 693).



Figs. 37-39. Female genitalia of *Nola* species: 37 — *N. harouni* (MF 2166), 38 — *N. aerugula aerugula* (MF 2179), 39 — *N. squalida* (OK 4769).

Apart from differences in wing markings etc., Lempke (1938) based his species-level separation of *aerugula* and *holsatica* on alleged differences in genitalia identified by Diakonoff (1938). Hoffmeyer (1948: 122) stated that "these differences are not large!". Studies of genitalia from Danish populations of *holsatica* and *aerugula* by N. P. Kristensen and the present authors showed no convincing differences.

Lempke (1938) also stated that larvae of *holsatica* from Holland and adjacent parts of Germany live on *Genista pilosa* and *G. angelica*, which should not be the host plants of *aerugula*. The latter feeds on a number of plants within Fabaceae, especially *Lotus corniculatus*. However, Hoffmeyer (1960: 169) pointed out that *Genista*-plants do not occur in all Danish localities where *holsatica* occurs.

Based on the above mentioned information we have arrived at an opinion that these two taxa should be treated as conspecific. However, since *holsatica* looks quite different from other populations of *aerugula*, and since it is (at least to some extent) geographically isolated, we propose that *holsatica* is treated as a subspecies of *aerugula*.

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